A Proposal to the

NOAA Coastal Services Center
2011-2013 Coastal Management Fellowship Program

Submitted by the

South Carolina Department of Health and Environmental Control
Office of Ocean and Coastal Resource Management

Project Title:

Identifying Vulnerabilities and Mitigating Coastal Hazards in South Carolina

D H E C

PROMOTE PROTECT PROSPER

Ocean and Coastal Resource Management

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BACKGROUND AND INTRODUCTION

DHEC-OCRM

The South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management (DHEC-OCRM) implements the SC Coastal Zone Management Program. The Program was established in 1977 under the SC Tidelands and Wetlands Act, which requires the agency "to protect the quality of the coastal environment and to promote the economic and social improvement of the coastal zone and of all the people of the State." DHEC-OCRM has direct permitting authority over the "critical areas" of the coast, defined as coastal waters, tidelands, and the beach/dune system. Indirect management authority of coastal resources is granted to DHEC-OCRM throughout the eight coastal counties (Horry, Georgetown, Berkeley, Charleston, Dorchester, Colleton, Beaufort, and Jasper), which together comprise the landward extent of the state's "coastal zone" (the coastal zone also includes coastal waters and submerged lands seaward to the State's jurisdictional limits). Within the coastal zone, DHEC-OCRM has the authority to review any project requiring a state permit (certification); as well as any federal permit, license, funding, or direct federal activity (consistency determination) to determine if the project is consistent with the policies and procedures of the SC Coastal Management Program.

Over the past two decades, South Carolina's eight coastal counties have experienced rapid growth, much of which has occurred in the form of residential development. Between 1990 and 2008, the population of Beaufort County expanded by 74%, Colleton County by 13.5%, Charleston County by 18%, Georgetown County by 31%, and Horry County by 79% (NOAA, 2009a). This growth has resulted in even greater pressures to develop waterfront properties – not only beachfront, but also along estuarine, riverine, and tidal creek shorelines. At the same time, many of these shorelines are experiencing erosion due to natural (e.g. barrier island migration, sea level rise, coastal storms) and anthropogenic (e.g. jetties, dams) forces. Scientists are projecting increased rates of sea level rise in response to global climate change. Over the past century, relative sea level rise has been measured at 31 and 40 cm in Charleston and Myrtle Beach, respectively (NOAA, 2009b), and projections indicate potential doubling to even tripling of that rate during the coming century (US CCSP, 2009). Shoreline erosion and other impacts of coastal storms are expected to increase as the rate of sea level rise increases. The coast is considered overdue for a major hurricane strike, as the last significant storm impact occurred in 1989 with Hurricane Hugo.

The SC Coastal Management Program has a number of policies and regulations that address coastal hazards. Most importantly, the state has adopted a policy of "retreat" from eroding beaches. Under the state's Beachfront Management Act, DHEC-OCRM establishes and periodically revises two lines of jurisdiction for oceanfront property: the "baseline" and the more landward 40-year "setback line." These lines establish the boundaries for the state's jurisdiction and are used to regulate the size and location of new or replacement structures located near the beach. Seaward of the setback line, new erosion control structures such as seawalls and rock revetments are banned, and new habitable structures are limited in size to 5,000 square feet of heated space, effectively eliminating new commercial hotels and condominiums. These same lines are used to regulate the repair or reconstruction of existing erosion control structures and habitable structures following a storm. Existing seawalls cannot be rebuilt if the degree of

damage to the structure exceeds 50%, while existing habitable structures must be rebuilt farther landward, if possible, when storm-related damage exceeds 66%. In order to enforce these building restrictions, DHEC-OCRM must conduct post-storm damage assessments. Houses that are presently out of the state's jurisdiction may become jurisdictional if the baseline and setback line are revised landward. No similar policy of retreat exists for non-beachfront shorelines. Developments are generally not permitted to encroach into tidal marshes, including the transitional banks of the marshes. However, permit applications for bulkheads and revetments appear to be increasing over the past few years, and permits are not required for erosion control devices constructed landward of the "Critical Line" as defined by the agency. Therefore, the extent of shoreline that is hardened is presently unknown, and trends are difficult to evaluate because mechanisms to track permits were not consistent prior to 2001.

State Beachfront Management Plan

The South Carolina Beachfront Management Plan was approved by the State General Assembly in 1992 and is included as a chapter in DHEC-OCRM's Critical Area Permitting Regulations. Although the Plan calls for review with possible revisions every five years, to date the state has not initiated promulgation of amendments to this regulation. Much of the data is out of date and many of the guidelines provided in the Plan are in need of modification. DHEC-OCRM is beginning the process of updating the Plan, which will promote better shoreline management by utilizing the most current and accurate data to modify guidelines and to inform decision-making. The updated state plan will incorporate many recommendations from the Shoreline Change Advisory Committee and provide the framework for updating and strengthening future Local Comprehensive Beach Management Plans.

Shoreline Change Advisory Committee

Recently, with the assistance of a prior NOAA Fellow, DHEC-OCRM launched a multi-year "Shoreline Change Initiative" to examine the past and future of shoreline management in South Carolina's coastal zone, and to identify science and policy recommendations for the coming decades (DHEC-OCRM, 2010). The recommendations of a 23-member Shoreline Change Advisory Committee include several related to improved management of coastal hazards. Among other recommendations, the final report of the Committee calls for:

1) Disallowing the seaward movement of the DHEC-OCRM baseline;

2) Increasing the minimum beachfront setback distance;

3) Reducing building in the most vulnerable beachfront areas;

4) Encouraging local shoreline communities to adopt more stringent regulations for building setbacks and vegetated buffers;

5) Limiting public subsidies of new development in hazardous areas; and

6) Expanding real estate disclosure requirements.

In the coming year, the recommendations of the Shoreline Change Advisory Committee will be evaluated by a new "Blue Ribbon Committee on Shoreline Management in the Coastal Zone" in order to develop specific policy and regulatory changes.

The following fellowship objectives will address several recommendations of the Shoreline Change Advisory Committee and result in improved beachfront management in South Carolina.

GOALS AND OBJECTIVES

The goal of this fellowship will be to support improved decision-making by DHEC-OCRM with respect to beachfront management and coastal hazards mitigation. This will be accomplished by:

1) Analyzing the short- and long-term economic implications of various proposed policy and regulatory changes pertaining to beachfront management;

2) Developing a Coastal Vulnerability Index for the state's ocean shorelines to be included in the updated State Beachfront Management Plan;

3) Supporting a regional-level effort to enhance community resilience to coastal disasters and climate change impacts; and

4) Researching the ecological benefits of natural unstabilized inlets.

PROJECT DESCRIPTION

Objective 1 – Analyze the Economic Implications of Proposed Policy/Regulatory Changes

As the new "Blue Ribbon Committee on Shoreline Management in the Coastal Zone" begins meeting to review the recommendations from the Shoreline Change Advisory Committee, their primary concern will likely be how any proposed policy or regulatory changes would affect the local and state economy. The Fellow will analyze the economic implications of proposed changes under different scenarios. For example, if the beachfront setback line minimum distance were increased from 20 feet to 50 feet, how many additional properties would be captured within the setback line, and what are the values of those properties? This type of analysis would consider private property, public property and infrastructure, tourism, and ecosystem values and services.

Objective 2 – Develop a Coastal Vulnerability Index

The Fellow will develop a Coastal Vulnerability Index for the state's ocean shorelines using GIS and various data, including elevations, long-term erosion rates, proximity to inlets, property values, distances between buildings and the active beach, dry sand beach widths, and beach profile volumes. The results of this analysis will be used by DHEC-OCRM to identify areas

along the beach that are most susceptible to the impacts of storm surge and sea level rise, and the results will improve coastal real estate disclosure as recommended by the Shoreline Change Advisory Committee. The Coastal Vulnerability Index will also be included in the updated State Beachfront Management Plan to guide future decision-making at the state and local levels.

Objective 3 – Support a Regional Effort to Enhance Community Resilience

The Governors' South Atlantic Alliance (SAA) was launched in October 2009 to foster regional approaches to shared coastal and ocean management issues (see http://www.scseagrant.org/images/gsaa_site/index.htm). DHEC-OCRM staff have been advancing this effort in a number of ways and were designated as the lead for one of the four focus areas – "Disaster Resilient Communities." For the southeast region (NC, SC, GA, FL), the Alliance will undertake activities to:

- Enhance understanding of ocean and weather dynamics, including short-term coastal hazards and long-term climate change; and

- Share best practices to minimize losses and accelerate recovery, while implementing new and more effective coastal and land use strategies to minimize future risk.

The Fellow will assist DHEC-OCRM in meeting support, plan development, and (potentially) through the implementation of initial "actions" or projects identified by the regional representatives.

Objective 4 – Research the Ecological Benefits of Natural Unstabilized Inlets

Beach renourishment and other "soft" solutions to erosion control are the preferred alternatives to hard stabilization in South Carolina. Since renourishment projects add sand to the beach from an external source, they are the only engineered shore protection alternative that addresses the problem of a sand budget deficit (NRC, 1995). However, in recent years, DHEC-OCRM has been receiving an increasing number of permits seeking to manage erosion along unstabilized inlets through either ebb shoal manipulation or inlet channel relocation. The ecological impacts of such projects are not clear at this time. The Fellow will research the ecological benefits of natural unstabilized inlets (habitat, foraging, nesting, roosting, etc.) and how these benefits would be affected by a typical inlet management project. The Fellow will review previous inlet relocation projects in South Carolina and other projects in the Southeast to document the net gain/ loss or recovery rate of important habitat types. The Fellow will draft a white paper, which will be used by DHEC-OCRM permitting and planning staff to support permit reviews.

MILESTONES AND OUTCOMES

Milestone	Outcome
April/May 2011	Attend Fellow matching workshop.
July 2011	Fellow is hosted on a preliminary visit to DHEC-OCRM's office in Charleston, SC.
August 2011	Fellowship begins. Fellow orientation at DHEC-OCRM with an introduction to staff and briefing from key staff members regarding South Carolina's coastal zone management program.
January 2012	Fellow completes economic analysis of proposed policy or regulatory changes.
February 2012	Fellow attends fellowship meeting in Charleston, SC.
Summer 2012	Fellow attends The Coastal Society conference in Miami, FL and presents a poster.
October 2012	Fellow completes the Coastal Vulnerability Index.
February 2013	Fellow attends fellowship meeting in Charleston, SC.
April 2013	Fellow completes research paper on the ecological benefits of natural unstabilized inlet areas.
Spring-Summer 2013	Fellow continues assisting DHEC-OCRM staff with updating the State Beachfront Management Plan.
Summer 2013	Fellow attends The Coastal Zone conference and gives an oral presentation.
July 2013	Fellowship ends.

FELLOW MENTORING

Braxton Davis, Director of DHEC-OCRM's Policy and Planning Division, will be the primary mentor and will provide general oversight for the fellowship. Braxton has experience in both environmental and policy research and development, and currently serves as vice chair of the Coastal States Organization (CSO) in Washington DC. He is the primary DHEC representative on the SC Hazard Mitigation Planning Committee, and is currently serving as a panel member on climate change adaptation for the National Academy of Sciences (http://americasclimatechoices.org/). He recently served as chair of a coastal hazards and climate

change committee for CSO (CSO, 2007), and was a member of a "cross-cutting technical work group" for the South Carolina Committee on Climate, Energy, and Commerce. Braxton also mentored a NOAA Coastal Management Fellow from 2007-2009.

Matt Slagel, Shoreline Management Specialist in DHEC-OCRM's Policy and Planning Division (and Braxton's previous mentee), will also serve as a mentor for the Fellow. As a previous Fellow himself, Matt understands the program and what would be expected of him as a mentor. He provided research and technical support for the Shoreline Change Advisory Committee during his fellowship, and he is leading the effort to update the State Beachfront Management Plan. Matt's knowledge of coastal processes, GIS, and the beachfront management framework in South Carolina will allow him to contribute to the Fellow's professional development and assist with the objectives in this proposal.

The Fellow will also benefit from daily exposure to 40 coastal zone management professionals with a variety of skills and backgrounds working at DHEC-OCRM. Opportunities will exist for the Fellow to participate in field work and permit review sessions for projects as diverse as dock and marina construction, navigation channel dredging, public highway construction, beach renourishment, and commercial high-ground development. DHEC-OCRM staff members have a variety of backgrounds in engineering, planning, geography, oceanography, and geology, and will be available to interact with the Fellow on other coastal zone management issues as part of the Fellow's overall exposure to South Carolina's program.

PROJECT PARTNERS

As South Carolina's coastal zone management agency and host agency for the Fellow, DHEC-OCRM will provide opportunities for the Fellow to work with other regulatory and planning groups within the state. In particular, the Fellow will interact with the Blue Ribbon Committee on Shoreline Management in the Coastal Zone and the Governors' South Atlantic Alliance, and will participate in all interagency and partner meetings related to coastal hazards.

COST SHARE DESCRIPTION

DHEC-OCRM will provide in kind services and $15,000 ($7,500 for Year 1 / $7,500 for Year 2) in non-federal match for the NOAA Coastal Services Center Fellow. This non-federal match will be provided with state revenue. DHEC-OCRM will provide additional non-federal match associated with various operating expenses, which may include travel, supplies, equipment and other costs. For in kind services, DHEC-OCRM will provide the Fellow with a desktop computer and/or laptop with Microsoft Office and ArcGIS software; access to high-resolution aerial photography; use of state vehicles for field work and other related travel; opportunities to attend training sessions; and use of all general office equipment.

STRATEGIC FOCUS AREA

This fellowship directly addresses Strategic Focus Area II, "Changing Climate." The Fellow will build on two ongoing DHEC-OCRM studies on shoreline change and on coastal climate adaptation (Davis et al., in progress). Climate change impacts and vulnerabilities will be explicitly addressed in all aspects of the fellowship described above, including the economic analysis of proposed beachfront policy or regulatory changes, the development of a Coastal Vulnerability Index, the work of the Governors' South Atlantic Alliance, and the research pertaining to the ecological benefits of natural unstabilized inlet areas.

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